

Appl. No : 09/916,247 Confirmation No.: 9131
Applicant : COTE et al.
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Title : CHEMICAL CLEANING BACKWASH FOR NORMALLY
IMMERSED MEMBRANES
TC./A.U. : 1723
Examiner : MENON, Krishnan S.
Docket No. : 4320-347
Customer No. : 001059

Board of Patent Appeals and Interferences
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REPLY BRIEF

The Appellants make the following submissions in reply to the Response to Arguments section of the Examiner's Answer mailed on September 13, 2007. The Appellants do not admit any points made in the Examiner's Answer that are not specifically addressed below.

ARGUMENT

I. Rejection of Claims 26-36 over Smith in view of Del Vecchio

This section corresponds to Part III of the Examiner's Response to Argument, starting at page 15 of the Examiner's Answer.

Claim 26

The Examiner, at the middle of page 15 in bold print, argues that the Appellant presented no arguments to show patentability over the prior art cited. The Appellant respectfully disagrees and relies on the arguments in its Brief in Support of Appeal. The Appellant further notes that the Examiner bears the initial burden of proving a prima facie case of obviousness (MPEP 2142).

The Examiner identifies three points of argument, (a), (b) and (c). Argument (a) relates to whether Smith teaches that draining the tank, as in a prior art process summarized in Smith, is undesirable and not part of the inventive process disclosed in Smith. Regarding the first point, the Examiner notes that the prior art process disparaged in Smith involves draining the tank, filling with cleaning solution, draining the tank again and re-filling the tank. While this process involves more than merely draining the tank, it is the only process described in Smith in which a tank is drained for chemical cleaning and it is the same process that the Examiner relies on to argue that draining a tank is obvious. Therefore the fact remains that Smith disparages the very same process that the Examiner relies on to provide one of the elements of claim 26.

In the middle of page 16 of the Examiner's Answer, the Examiner agrees that draining the tank is not part of Smith's inventive process and that Smith teaches eliminating the draining step because it is undesirable. The Appellant submits that these facts therefore indicate that a person skilled in the art reading Smith would be taught that draining the tank is unnecessary (because the method in Smith does not require it) and undesirable. The person skilled in the art is therefore taught away from using a step of draining the tank and therefore taught away from claim 26 which has a minimum frequency of tank draining steps.

At the bottom of page 16 of the Examiner's Answer, the Examiner notes that another prior art process in which a tank is drained in association with a cleaning step was

described in a reference to French Patent No. 2,741,280 in the Appellant's specification. There is no objection on record in relation to either the Appellant's specification or French Patent No. 2,741,280. The Examiner's argument also does not meet the requirements recited in MPEP 1207.03 (I) for making a new ground of rejection. Accordingly, the Appellant submits that the Examiner's argument on this point is improper, has no relevance to any ground of rejection, and should therefore be ignored. In the alternative, the Appellant submits that the mere reference in the Appellant's specification or the French patent to a part of one element of claim 26 in no way establishes a prima case of obviousness.

In discussing step (e)(ii), the Examiner implies that draining the tank may be done any time (before, during or after) relative to chemical cleaning. The Appellant submits that this is incorrect because step (f) states that the step of wetting the membranes with a cleaning chemical must be done after or while (not before) step (e) – draining the tank. However, as this distinction is not material to the Examiner's comments in relation to step (e)(ii) under the present ground of rejection, the Appellant will further explain this aspect of the claim in response to the rejection over Del Vecchio where the Examiner raises the issue again.

With respect to argument (b), at page 18 of the Examiner's answer the Examiner argues that the anticipation cases cited by the Examiner would not fall apart if applied to obviousness. The Appellant respectfully disagrees. The cases cited by the Examiner (the references are repeated at page 6 of the Examiner's Answer) are generally to the point that an embodiment disclosed in a reference may be used in an anticipation rejection even if the reference disparages the embodiment. Such a principle is entirely inapplicable to obviousness rejections in which the Examiner alleges that it would be obvious to combine references. Disparaging statements against a process indicate that it would not be obvious to create a combination using such a disparaged process.

In the second paragraph on page 18 of the Examiner's Answer, the Examiner refers to the possibility of tank draining steps being added to Smith's process to address situations where the cleaning required was harsh or detrimental to the biomass. These possibilities are also contrary to the teaching in Smith. For example, at column 12, lines 56 to column 13 line 4, Smith teaches that detrimental effects on the biomass can be controlled by applying cleaning chemicals to the insides of the membranes at a pressure which causes only diffusion of the chemical through the membrane pores "so as to maintain the viability of the bacteria population in the reactor." Thus Smith teaches solutions to the issues raised by the Examiner to do not involve draining the tank.

Argument (c) considers step (f) of claim 26, which requires that the steps of wetting the membranes with the cleaning chemical while or after draining the tank of retentate, and therefore draining the tank, occur at least once a week. The Examiner refers to Figure 4 of Smith. This Figure has already been considered in the Decision on Appeal decided on February 28, 2007 in Appeal 2006-2898, a copy of which was attached to the Appellants' Brief in Support of Appeal. Page 4 of that decision states that, "Smith Figure 4 describes three relevant chemical containing cleaning events (1, 5 and 6)." This is contrary to the Examiner's argument that all of steps 1-6 in Smith Figure 4 involve wetting the membranes with a cleaning chemical. Further, none of the steps in Smith Figure 4 are performed after a permeation step, after or while draining the tank of retentate, and before returning to a subsequent permeation step as required by step (f) of claim 26. Accordingly, even cleaning events 1, 5 and 6 are irrelevant to step (f) of claim 26.

The Examiner further argues that Del Vecchio teaches cleaning more or less than once a month. The Appellant relies on page 10, 11, 16 and 17 of its Brief in Support of Appeal. To summarize those arguments, (a) page 7 of the Decision on Appeal of February 16, 2007 in Appeal 2006-2492, a copy of which was attached to the Appellants' Brief with Support of Appeal, held that Del Vecchio does not expressly or

inherently describe a frequency of at least once a week, (b) the Examiner has not met all of the requirements of MPEP 2144.05 II for proving obviousness of a parameter range, and (c) the intensity and length of time required for the cleaning process in Del Vecchio are contrary to a cleaning frequency of at least once a week. The Appellant further submits, as more fully argued at page 9 of their Brief in Support of Appeal, that the cleaning process in Del Vecchio is precisely the sort of cleaning process that Smith disparages which indicates against a combination of these two references.

Claim 27

The Examiner's Answer relies on the Examiner's arguments given in relation to claim 26. The Appellant similarly relies on its arguments given in relation to claim 26. However, in claim 26 the required frequency of chemical cleaning and tank draining is at least daily which makes the cited references even less applicable.

Claim 28

The Examiner argues that "recovery cleaning" is not clearly differentiated from the cleaning steps of claim 26. There is no objection on record in relation to any lack of clarity in the claim. The Examiner's argument also does not meet the requirements recited in MPEP 1207.03 (I) for making a new ground of rejection. Accordingly, the Appellant submits that if the Examiner's argument on this point is intended to invoke 35 USC 112, then the argument is improper, has no relevance to any ground of rejection, and should therefore be ignored.

In the alternative, the Appellants submit that recovery cleaning is described in the application as filed, for example at page 2, line 21 to page 3, line 11, as being a term used in the art to describe cleaning instituted after the permeability of the membranes have reached an unacceptable value to substantially restore the permeability of the membranes. The Examiner notes that recovery cleaning would be, "a somewhat more intensive cleaning than that afforded by claim 26, like stronger chemicals, more

concentration, longer periods, temperature, etc." While the Appellant does not acknowledge the Examiner's summary as a binding construction of the claim, it is consistent with the passages on pages 2 and 3 of the application as filed noted above. In particular, page 2, lines 23 to 24 note that recovery cleaning is performed infrequently, line 28 notes the long duration of recovery cleaning and lines 28-29 note the harshness of the cleaning and its potential to damage the membranes which is consistent with exposure to strong chemicals for long periods. By contrast, the cleaning events of Claim 26 are less intense than the recovery cleaning steps added in claim 28. This is consistent with the distinction described in claim 28 wherein the steps of claim 26 performed between recovery cleaning steps merely reduce a rate of decline in permeability of the membranes between the subsequent recovery cleaning steps. The Appellant submits that the term recovery cleaning is clear to a person skilled in the art reading the specification and satisfies 35 USC 112. The Appellant further submits that the claim clearly requires a process having two types of cleaning event, the cleaning events of claim 26 and the recovery cleanings that are distinct steps.

The Examiner argues that Del Vecchio and Smith teach varying the degree of cleaning. However, in both references, there is no combination of recovery cleaning events with cleaning events according to claim 26 performed between the recovery cleaning steps.

Claims 29 and 30

The Examiner argues that, "if the references do not actually teach the values, or if they are not determinable to be within the exact range of values as claimed, they are optimizable variables." The Appellants submit that it is improper for the Examiner to suggest that the references might teach the claimed values or be within claimed ranges without being able to establish that either proposition is true. The Examiner cannot imply possibilities without support by evidence. Further, allegations that variables can be optimized must meet the standards of MPEP 2144.05 II. Those standards can not be met in this case for the reasons described in the Appellant's Brief in Support of Appeal.

Further, there is no evidence or reason why the motivations for optimization cited by the examiner would obviously lead a person skilled in the art to the claimed range. The ranges of weekly CT in claims 29 and 30 have upper limits. The Examiner's stated reasons for optimization all express a desire to keep the membranes free of fouling. The Examiner has provided no rational underpinning to support his conclusion that a concern for keeping the membranes free of fouling would cause a person skilled in the art to use, in the context of a process according to claim 26, a weekly CT below the upper limits claimed in claims 29 and 30.

Claim 31

The Examiner suggests again that the claim is indefinite but this time expressly denies that there is a new ground of rejection, yet asks the Board to apply their own discretion. The Appellants submit that since there is no new ground of rejection, the Board has no discretion to consider the Examiner's remarks or should exercise its discretion to ignore the Examiner's remarks. In the alternative, the Appellants submit that for the reasons described in relation to claim 28, the claim is clear. Further, the Examiner's suggestion that the time between recovery cleanings can be optimized does not consider the claim as a whole. The claim as a whole requires not just recovery cleanings performed at least one month apart, but cleaning events performed at least once a week while or after draining the tank of retentate to provide a reduced rate of decline in permeability between the recovery cleanings. The Examiner's argument does not provide a prima facie case against such a combined process.

Claim 33

Claim 33 adds limitations that explicitly distinguish claim 26 from the random events in Smith Figure 4. Claim 33 is further distinguished from cleaning triggered by factors other than predetermined periods of time, for example cleaning triggered by the

membranes having reached a predetermined unacceptable state of fouling. The Appellant submits that its arguments are commensurate with the scope of the claim.

Claim 34

The Appellant submits that the elements of claim 34 are not found in either of the cited references.

Claims 32, 35 and 36

For the purposes of this appeal, The Appellants submit that claims 32, 35 and 36 are allowable for the reasons given in relation to their parent claims.

II. Rejection of Claims 26-28, 31 and 34-36 as obvious over Del Vecchio

This section corresponds to Part IV of the Examiner's Response to Argument, starting at page 21 of the Examiner's Answer.

On pages 21 to 22 of the Examiner's Answer, the Examiner argues that claim 26 includes wetting the membranes with a cleaning chemical before, during or after draining the tank of the retentate. The Appellants submit that this construction is not correct since claim 26 requires chemical cleaning during or after, but not before, draining the tank of the retentate. The Examiner refers to part ii) of the wherein clause of claim 26 which states that the step of backwashing (which is step (d) of claim 26) may be performed before, during or after draining the tank (which is step (e) of claim 26). The Examiner further argues that wetting the membranes with a cleaning chemical can be accomplished by way of backwashing the membranes with a chemical cleaner. The Appellants agree that backwashing the membranes with a cleaning chemical is a process physically available for wetting the membranes with a cleaning chemical, but submit that such backwashing with a cleaning chemical does not provide step (f) of claim 26 if performed before draining the tank of the retentate. Wetting the membranes with a cleaning chemical is explicitly stated in step (f) to occur after or while performing

step (e) (draining the tank of the retentate). Accordingly, any backwash that occurs before draining the tank does not provide step (f). Further, the cycles described in steps (a) to (e) may involve backwashing with permeate and may occur more (but not less) frequently than step (f). For example, a process within the scope of parts (a) to (e) and the wherein clause of claim 26 could include a daily cycle of steps (a) to (e) with step (d) provided by backwashing the membranes with permeate before draining the tank of the retentate. Step (f) could be provided in this example process by adding a step, performed at least once per week, of backwashing the membranes with a cleaning chemical. However, this additional step would have to be performed after or while draining the tank of the retentate to meet the express language of part (f) of claim 26.

On pages 22 to 24 of the Examiner's Answer, the Examiner argues that the "deep cleaning" in Del Vecchio makes claim 26 obvious. The Appellants disagree for the reasons given in the Brief in Support of Appeal and for the two further reasons given below. First, the Examiner notes that Del Vecchio teaches deep cleaning at a frequency of once or month, or more or less frequently. The Examiner sometimes, for example in the middle of page 24, isolates only part of that phrase and describes Del Vecchio as teaching a cleaning frequency of once per month or more frequently. The Appellants submit that such a description is not a fair reading of the reference because it implies a suggestion in Del Vecchio to experiment preferably with more frequent cleanings whereas Del Vecchio actually does not express any preference as between more or less frequent cleanings. Second, the Examiner argues (also in the middle of page 24 of the Examiner's Answer) that Del Vecchio disclosed a range of 'once a month or more frequent intervals' that includes once a week. The implication in the Examiner's argument is that by referring to a frequency of once a month or more frequently, Del Vecchio has disclosed a range including all possible frequency values between once a month and infinitely frequent. The Appellants submit that Del Vecchio discloses no such range. Because Del Vecchio does not disclose a pair of end points, Del Vecchio does not disclose any range at all. Further, as described in the Brief in Support of

Appeal, the Decision on Appeal 2006-2492 decided, on page 7, that Del Vecchio did not expressly or inherently disclose a once a week frequency. The Appellants submit that Del Vecchio similarly did not disclose any range including a once per week frequency.

Claim 27

The Examiner argues that it is feasible to have the deep cleanings in Del Vecchio performed once per day. The legal standard at issue is not feasibility, but instead obviousness. The Appellants submit that the Examiner's arguments do not consider obviousness. First, the Examiner argues that arguments relating to the duration of the deep cleaning in Del Vecchio (which have a preferred duration of at least 4 hours) are not commensurate with the scope of claim 27 because claim 27 does not specify a duration. But the question is whether it would be obvious, given a teaching of a process performed monthly, to perform the same process daily. The Appellants submit that the significant duration of the process would be an impediment to attempting to use the Del Vecchio deep cleaning process with a markedly increased frequency. The duration of the cleaning event is therefore an indicator that the frequency in claim 27 is not obvious. Secondly, the Examiner argues that by teaching that a duration of several hours a day is preferable, Del Vecchio contemplates shorter non-preferable durations. The Appellants submit that disclosure of a preferred value does not constitute implicit disclosure of every other possible value as non-preferred alternatives. There is no disclosure in Del Vecchio, preferred, non-preferred or otherwise, of a deep cleaning cycle of less than 4 hours duration. The Appellants submit that wetting membranes for 4 hours out of every 24 hours would not be obvious and instead that the person skilled in the art would be led by the lost permeation time as well as the damaging effect of such lengthy exposure of the membranes to chemicals to not consider a daily performance of step (f).

The Examiner alternately relies on the pulsed cleaning (i.e. backwashing) mentioned in Del Vecchio. The Appellants acknowledge that pulsed cleaning is performed frequently

during normal operation (rather than during deep cleaning) in Del Vecchio. However, the pulsed cleaning does not involve wetting the membranes with a cleaning chemical after or while draining the tank of the retentate and so does not provide step (f).

Claims 28 and 31

The Examiner again argues that the claims 28 and 31 are indefinite. The Appellants repeat and rely on their submissions made in this Reply Brief in response to the rejection of claims 28 and 31 over Smith in view of Del Vecchio.

The Examiner further relies on column 12, lines 30-40 of Del Vecchio which describes pulsed cleaning with a chemical cleaner while deep cleaning. The Examiner argues that the pulsed cleaning provides step (f) of claim 26 while the deep cleaning provides the recovery cleaning added in claim 28. This argument is incompatible with the Examiner's argument in relation to claim 26 that the deep cleaning (not the pulsed cleaning) provided step (f) of claim 26. Further, the two types of cleaning are provided simultaneously in the process described in column 12 of Del Vecchio, which is contrary to claim 28 which requires the steps of claim 26 to be performed between recovery cleanings. Yet further, the pulsed cleaning performed while deep cleaning does not involve wetting the membranes with a cleaning chemical at least once per week while or after draining the tank of retentate. Accordingly, the Appellants submit that the cited reference does not provide the elements of claim 28 or make them obvious.

The Examiner further argues that, "Del Vecchio teaches additional process steps as necessary." This is an unreasonable generalization of the specific disclosure in Del Vecchio of a deep cleaning process enhanced by simultaneous pulsed cleaning. Similarly, the disclosure in Del Vecchio of one specific process does not make it obvious for a person skilled in the art to have, "any other type of cleanings, as one wishes" as argued by the Examiner in the middle of page 26 of the Answer. There is no teaching or suggestion in Del Vecchio of any where near the breadth asserted by the Examiner.

Having given no other support for his immensely broad contentions, the Examiner has not established a prima facie case of obviousness.

Claim 34

The Examiner gives has no support for his allegation that the additional step of backwashing with permeate would be obvious to remove the cleaning chemical before resuming normal operation. The Examiner has no evidence suggesting that such a teaching, or the problem, was known in the art or provided in any reference. Such unsupported allegations do not establish a prima facie case of obviousness.

Claims 35 and 36

The Appellants rely on their submissions regarding claim 26 in support of claims 35 and 36.

III. Rejection of claims 29, 30, 32 and 33 as obvious over Del Vecchio in view of Smith.

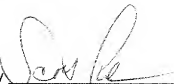
This section corresponds to Part V of the Examiner's Response to Argument, starting at page 26 of the Examiner's Answer.

The Examiner states that the Appellant made no separate arguments in relation to these claims. The Appellant submits that arguments in relation to claims 29 and 30 were made on page 20 of the Brief in Support of Appeal. For claims 32 and 33, the Appellant relies on its arguments made in relation to claims 26, 28 and 29.

Summary

For the reasons above, the Appellant submits that the rejections of claims 26-36, should be reversed.

Respectfully submitted,
BERESKIN & PARR

By 

Scott R. Pundsack
Reg. No. 47,330
Tel: 416-957-1698